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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/743,271 | 12/23/2003 | Helmar Van Santen | 081468-0307331 | 4441 |

909 7590 11/20/2006

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| EXAMINER | |
|---|---|
| NGUYEN, HUNG | |
| ART UNIT | PAPER NUMBER |
| 2851 | |

DATE MAILED: 11/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/743,271 | VAN SANTEN ET AL. | |
| | Examiner | Art Unit | |
| | Hung Henry V. Nguyen | 2851 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *19 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1,3-13,15-25 and 27-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1,3-13,15-20,30 and 32-37* is/are allowed.

6)☒ Claim(s) *21,25 and 27-29* is/are rejected.

7)☒ Claim(s) *22-24* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Prosecution Status*

1. This action is **non-final** rejection since the Examiner has changed the art and advanced new arguments.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 21 is rejected under 35 U.S.C. 102(b) as being anticipated by Fukami et al (WO9/49504) ) (hereinafter referred to as "Fukami").

With respect to claim 21, Fukami discloses an immersion lithographic projection apparatus comprising all of the limitations of the instant claims such as: an illumination system (1) configured to provide a beam of radiation; a support structure (RST) configured to hold a patterning device (R), the patterning device configured to impart the beam with a pattern in its cross-section; a substrate table (9-11) configured to hold a substrate (W); a projection optical system (PL) configured to project the patterned beam onto a target portion of the substrate; a liquid system (5) configured to provide an immersion liquid to a space between the substrate and the projection system, the liquid supply system having at least one immersion liquid inlet port (25a,b) not provided on the substrate table, and the inlet port is connected to supply system (5) and is mechanically isolated from the projection optical system and the immersion liquid is not

substantially confined in the space so that the liquid can flow out of the space (see figure 1 and 2).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Takanashi et al (U.S.Pat. 4,480,910) in view of Binnard et al (US 2002/0109823 A1).

With respect to claim 21, Takanashi (figure 3) discloses an immersion lithographic projection apparatus comprising substantially all of the limitations of the instant claims such as: an illumination system (6) configured to provide a beam of radiation; a support structure (not shown) configured to hold a patterning device (5), the patterning device configured to impart the beam with a pattern in its cross-section; a substrate table (not shown) configured to hold a substrate (1); a projection optical system (4) configured to project the patterned beam onto a target portion of the substrate; a liquid system (see col.4, lines 15-20) configured to provide an immersion liquid to a space between the substrate and the projection system, the liquid supply system having at least one immersion liquid inlet port (13) provided on a boundary of the space, not provided on the substrate table and the immersion liquid (3) is not substantially confined in the space so that the liquid can flow out of the space. Takanashi does not expressly disclose the inlet port (13) being mechanically isolated from the projection system. Binnard et al discloses a

lithographic device comprising an element (110) which is attached to the projection optical system (78) via a vibration isolation device (124). In view of such teachings, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Takanashi et al and Binnard et al to obtain the invention as specified in the above mentioned claims. It would have been obvious to a skilled artisan to employ the vibration isolation device, as suggested by Binnard et al, between the projection optical system(4) and the liquid inlet port (13) of Takanashi. The purpose of doing so would have been to prevent the vibration being transmitted between the projection optical system and the liquid inlet port and thus improving the quality of the printed images.

5. Claim 25, 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukami et al (WO9/49504) ) in view of Schuster et al (U.S.Pat. 6,781,668).

With respect to claims 28-29, Fukami discloses an immersion lithographic projection apparatus comprising substantially all of the limitations of the instant claim as discussed. Fukami et al does not expressly disclose an actuator configured to adjust at least of the height and tilt of the barrier member relative to the object. Schuster at al teach an actuator configured to adjust at least the height and tilt of barrier member (9) relative to the object (see col.6, lines 11-17). It would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of the Fukami and Schuster et al to obtain the invention as specified in the above claims of the present invention. It would have been obvious to a skilled artisan to utilize the actuator as taught by Schuster et al into the lithographic

apparatus/method of Fukami for the purpose of efficiently supplying the immersion liquid to the space between the projection system and the substrate.

As to claim 25, Fukami as modified by Schuster et al lacks to show the distance between the substrate and the barrier member being at least 50$\mu$m as recited in the claims. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to select the distance between the barrier member and the substrate as recited since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art . *In re Aller*, 105 USPQ 233.

6. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukami et al (WO9/49504) ) in view of Lin (U.S.Pat. 6,788,477).

As to claim 27, Fukami discloses an immersion lithographic projection apparatus comprising substantially all of the limitations of the instant claims except for at least one of immersion liquid outlet being provided on the substrate table or at least one immersion inlet port being connected to a base frame that supports the substrate table. Lin discloses an immersion exposure apparatus where a liquid outlet (32) is on the substrate table and an inlet port (30) is connected to a base frame that support the substrate table (see figure 2). In view of such teachings, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the teachings of Fukami and Lin et al to obtain the invention as specified in claims 23 and 27 of the present invention. It would have been obvious to a skilled artisan to provide at least one inlet port and at least one outlet port on the substrate table for the

purpose of supplying of new liquid and discharging of used liquid from the space between the projection lens and the substrate.

***Allowable Subject Matter***

7. Claims 1, 3-13, 15-20, 30, 32-37 are allowed.

8. Claims 22-24 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record either alone or in combination, neither discloses nor makes obvious the combination of a lithographic apparatus, comprising among other features, the liquid outlet port being radially outward of the liquid inlet port relatively to an optical axis of the projection optical system, as recited in the instant claims of the present invention.

***Response to Arguments***

9. Applicant's arguments filed October 19, 2006 have been carefully reviewed. In light of applicant's remarks, the rejection of claims 30, 32-37 under 35 U.S.C. 112, second paragraph is withdrawn. Turning to the prior art rejections, applicant's arguments have been carefully reviewed and have been traversed in view of new grounds of rejection as set forth above.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung Henry V. Nguyen whose telephone number is 571-272-2124. The examiner can normally be reached on Monday-Friday (First Friday off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diane Lee can be reached on 571-272-2399. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

**Hung Henry V Nguyen**
**Primary Examiner**
**Art Unit 2851**

hvn
11/11/06